

Program Assessment Plan

Bachelor of Science in Biology and Marine Biology Bachelor of Arts in Biology University of Alaska Southeast

Program Faculty

Carolyn Bergstrom, Ph.D., Associate Professor of Marine Biology
Heidi Pearson, Ph.D., Associate Professor of Marine Biology
Mike Navarro, Ph.D., Assistant Professor of Marine Fisheries
Michael S. Stekoll, Ph.D., Professor of Chemistry and Biochemistry
Sherry Tamone, Ph.D., Professor of Biology
David Tallmon, Ph.D., Professor of Biology

A. Student Learning Goals

The Biology faculty have collaborated to develop the Bachelor of Science in Biology, the Bachelor of Science in Marine Biology, and the Bachelor of Arts in Biology curricula (Appendix A) which provide solid foundations for students with a strong core in either general or marine biology. It is a rigorous curriculum that produces graduates ready to gain employment or pursue graduate study in the field. The degrees are designed to serve the needs of three groups of undergraduate students. First, the BS degrees are directed towards students preparing to enter graduate or professional schools. Graduate schools may include any of a number of foci in the field of biological science (e.g., genetics, conservation biology, ecology, physiology). Professional schools may include medical, dental, optometry, or veterinary. Second, the BS and BA degrees are designed to serve students seeking entry-level employment in the fields related to biology, including positions at state and federal agencies. Third, the BA in Biology specifically is designed to serve students preparing to enter the M.A.T. program in secondary education at UAS or other institutions and thus reflects the requirements for certification in science. All three of our degrees are designed to capitalize on the unique natural setting and natural resources in Southeast Alaska. Many of the courses involve hands-on field and laboratory exercises. Directed research with a faculty mentor is encouraged. The four program learning outcomes are common to all three of the degrees

Program Student Outcomes

- 1) Students will gain a broad background in biological sciences.
- 2) Students will develop critical thinking skills.
- 3) Students will improve oral and written scientific communication skills.
- 4) Students will gain practical experiences in basic biological research.

Data to be collected

- 1) Assessment data to determine how well our students are achieving the program learning outcomes
- 2) Student program data
 - a) Number of students in program as Freshman, Sophomores, Juniors and Seniors
 - b) Number of freshman students retained each year
 - c) Number of graduating students
- 3) Exit Questionnaire (Appendix B)
 - a) Graduating students will be provided a questionnaire ascertaining their perceived skills in our program learning outcomes
- 4) Biology Advisory Committee (BAC)
 - a) Annual meeting with BAC to discuss annual program assessment, modifications of the curriculum, and student opportunities.

How do we assess whether students obtained the program learning outcomes?

Program Outcome 1: Broad Background in Biological Sciences: Students will demonstrate a broad knowledge of biology including chemical principals, cellular metabolisms, organismal diversity, principals of genetics and evolution

- 1) We will report on the number of students out of the total number of students who passed (earned a C or better) the Fundamentals of Biology two course series (BIOL 105 and 106), We will compare this across years.
- 2) We will examine the distribution of grades each year in certain required courses (Ecology, Animal Physiology, and Genetics) to determine the percentage of students who pass with a C or better. We will compare this across years.

Program Outcome 2: Develop critical thinking skills. Students will demonstrate that they can use an empirical approach to evaluate a biological phenomenon using the primary literature

- 1) Students will develop research projects in the following courses: Ecology (BIOL 271), Communicating Science (BIOL 311), Experimental Design (BIOL 355), Phycology (BIOL 401), Physiology of Marine Animals (BIOL 415), Marine Ecology (BIOL 481), Research in Biology (BIOL 498).

Assessment data will include the percentage of students in a lower division course (BIOL 271) who gain skills and receive a C, B, or A on their written research report. We will compare these data to those obtained from two upper division courses (Marine Mammalogy and Genetics)

- 2) Students will evaluate and synthesize the primary scientific literature in the following courses:

Fundamentals of Biology (BIOL 105), Introduction to Marine Fisheries (BIOL 110), Invertebrate Zoology (BIOL 305), Communicating Science (BIOL 311), Tropical Marine and Coastal Ecology (BIOL 353), Discussions in Marine Mammalogy (BIOL 375), Marine Ornithology and Herpetology (BIOL 380), Marine Mammalogy (BIOL 384), Phycology (BIOL 401), Physiology of Marine Animals (BIOL 415), Ichthyology (BIOL 427), Aquatic Pollution (BIOL 480), Evolution (BIOL 482), Directed Research (BIOL 498). Assessment data will include the proportion of students earning a C or better for the portion of the grade based on the primary literature (e.g., discussion grade, written research paper).

- 3) Students will use the scientific method to solve scientific problems in the field and lab in the following courses:

Fundamentals of Biology I (BIOL 105), Ecology (BIOL 271), Tropical Marine and Coastal Ecology (BIOL 353), Genetics (BIOL 362), Marine Mammalogy (BIOL 384), Ichthyology (BIOL 427), Research in Biology (BIOL 498).

Assessment data will include the percentage of students in a lower division course (BIOL 271) who gain skills and receive a C, B, or A on their written report. We will compare these data to that obtained from two upper division courses (e.g., Genetics and Ichthyology)

Program Outcome 3 Oral & Written Scientific Communication Skills: Students will demonstrate that they are able to represent and communicate biological information. Many of our classes provide the opportunity for students to gain (100 and 200 level classes) and perfect (upper level classes) skills in science communication. The lists below provide courses that include science communication as part of their student learning outcomes.

Oral Presentations

Introduction to Marine Fisheries (BIOL 110), Introduction to Marine Biology (BIOL 215), Ecology (BIOL 271), Communicating Science (BIOL 311), Tropical Marine and Coastal Ecology (BIOL 353), , Conservation Biology (BIOL 373), Discussions in Marine Mammalogy (BIOL 375), Marine Ornithology and Herpetology (BIOL 380), Marine Mammalogy (BIOL 384), Phycology (BIOL 401), Physiology of Marine Animals (BIOL 410), Ichthyology (BIOL 427), Aquatic Pollution (BIOL 480), Research in Biology (BIOL 498)

Assessment data will include the percentage of students in a lower division course (BIOL 110, BIOL 215, BIOL 271) who gain skills and receive a C, B, or A on their oral presentation. We will compare these data to that obtained from two upper division courses (e.g., Marine Mammalogy and Physiology of Marine Organisms)

Written Communication

Fundamentals of Biology I (BIOL 105), Introduction to Marine Fisheries (BIOL 110), Ecology (BIOL 271), Communicating Science (BIOL 311), Tropical Marine and Coastal Ecology (BIOL 353), Genetics (BIOL 362), Marine Ornithology and Herpetology (BIOL 380), Marine Mammalogy (BIOL 384), Phycology (BIOL 401), Physiology of Marine Animals (BIOL 410), Ichthyology (BIOL 427), Aquatic Pollution (BIOL 480), Research in Biology (BIOL 498)

Assessment data will include the percentage of students in a lower division course (Biology 105) who gain skills and receive a C, B, or A on their written research paper. We will compare this data to that obtained from two upper division courses (e.g., Phycology and Marine Ornithology and Herpetology)

Communicating experimental results: Organic Chemistry (CHEM 341), Biochemistry (CHEM 342), Marine Mammalogy (BIOL 384), Research in Biology (BIOL 498)

Assessment data will include the percentage of students in a lower division course (Chemistry 105 and 106) who gain skills and receive a C,B, or A on their written notebook. We will compare these data to that obtained from two upper division courses (CHEM 341 and CHEM 342)

Program Outcome 4: Students will gain practical experiences in basic biological Research. Students will demonstrate their knowledge of techniques and skills gained in the biological sciences.

What courses provide these skills: Fundamentals of Biology I (BIOL 105), Fundamentals of Biology II (BIOL 106), Introduction to General Chemistry I (CHEM 105), Introduction to General Chemistry II (CHEM 106), Ecology (BIOL 271), Animal Physiology (BIOL 310), Organic Chemistry (CHEM 341), Biochemistry (CHEM 342), Tropical Marine and Coastal Ecology (BIOL 353), Genetics (BIOL 362), Marine Mammalogy (BIOL 384), Research in Biology (BIOL 498).

Assessment data will include the percentage of students who receive a C ,B, or A on the laboratory practical in Fundamentals of Biology II (BIOL 106), Animal Physiology (BIOL 310) and Biochemistry (CHEM 342)

Appendix 1

Link to Student Learning Outcomes

<http://www.uas.alaska.edu/Curriculum/docs/SLOs/undergraduate/BIOLfinal.pdf>

Appendix 2

Link to Course Catalog Information

Bachelor of Arts (BA) in Biology

<http://catalog.uas.alaska.edu/certificate-degree-programs/bachelors-degrees/biology-ba/#degreerequirementstext>

Bachelor of Science (BS) Biology

<http://catalog.uas.alaska.edu/certificate-degree-programs/bachelors-degrees/biology-bs/#version2text>

Bachelor of Science (BS) Marine Biology

<http://catalog.uas.alaska.edu/certificate-degree-programs/bachelors-degrees/marine-biology-bs/#degreerequirementstext>

Appendix 3

Exit Interview Questions for Graduating Seniors

What is your major degree? (circle one)

Marine Biology B.S. or Biology B.S. or Biology B.A.

Please circle the appropriate number.

1) I gained a broad knowledge of the biological sciences.

1 2 3 4 5
Agree strongly Neutral Disagree strongly

2) I developed critical thinking skills.

1 2 3 4 5
Agree strongly Neutral Disagree strongly

3) I improved my oral and written scientific communication skills.

1 2 3 4 5
Agree strongly Neutral Disagree strongly

4) I had practice using equipment and methods used in biological research.

1 2 3 4 5
Agree strongly Neutral Disagree strongly

5) My degree program prepared me for a career in the biological sciences.

1 2 3 4 5
Agree strongly Neutral Disagree strongly

6) Have you participated in the following research activities as part of your degree at UAS?

- BIOL 498
- Internship (with NOAA, ADF&G, Forest Service, etc.)
- EPSCoR, BLaST, INBRE, or URECAfunded undergraduate research project
- Volunteer work with a faculty member or agency
- Paid research assistantship (RA) during the Fall and/or Spring semester
- Other research experience: _____

7) What career track to intend to follow after graduation?

- Graduate or professional school
- Agency
- Non profit
- Private business
- Education
- Other _____

8) If you have any suggestions for how to improve our degree programs please provide them here: